

8-Nucleic Acid Methylation

Gary Clawson, Dawn Willis, and Arthur Weissbach

The topic of this conference, nucleic acid methylation, represents a well-described but poorly-understood modification. DNA methylation has been correlated with gene expression and 3-D structure, but it is unclear how DNA methylation relates to gene inactivation, how easily methylated genes can be activated, or whether methylation portends functional changes in chromatin structure. While RNA is methylated, the functional significance of this remains mysterious. Methylation of rRNA has traditionally been assigned a role in pre-rRNA processing, although more recent work has related 2'-O-ribose methylations to ribosome function and antibiotic interactions. Methylations in mRNA "caps" appear to have functional importance in processing and translation; the significance of internal m6A methylations is less clear, with roles proposed in processing and nucleocytoplasmic transport. These meetings will provide a comprehensive overview of mature RNA structures, with particular emphasis on methylations, and will explore the significance of base and ribose methylations in RNA/RNP genesis and function, while DNA-related sessions will focus upon how DNA methylation influences gene regulation and chromatin structure. These meetings will emphasize common themes between diverse fields, rather than a system-oriented approach.

DNA Methylation in Prokaryotes and Plants . Structure of Methylated DNA and Chromatin Formation . DNA Methyltransferases and DNA Replication . Role of DNA Methylation in Cellular Differentiation and Tumorigenesis . DNA Methylation and Gene Expression . Structure, Genesis and Function of mRNA Caps . Relationship of Methylation to Appearance of mRNA in the Cytoplasm . Ribosome Structure and rRNA Methylation . Role of Methylation in rRNA Maturation . Functional Aspects of rRNA Methylation .

PRELIMINARY PROGRAM, UCLA SYMPOSIUM ON NUCLEIC ACID METHYLATION, DNA SECTION

KEYNOTE ADDRESS, FRIDAY NIGHT, 3/31/89, 8:00 p.m.

Aaron Razin
Dept. Cellular Biochemistry
Hebrew University-Hadassah Medical School
Jerusalem, Israel 91010

Alternate:

Adrian Bird
MRC Mammalian Genome Unit
King's Buildings, West Mains Road
Edinburgh, EH9 3JT, UK

PLENARY SESSION I--DNA METHYLATION IN PROKARYOTES
(SAT. A.M. 4/1/89; 8:00-11:00 a.m.)

1. (Chairperson) Hamilton Smith
Dept. Molecular Biology and Genetics
Johns Hopkins University School of Medicine
725 Wolfe St.
Baltimore MD 21205
(301)955-3650
2. Vicki Chandler
Dept. Biological Science
Stanford University
Stanford, CA 94305
3. Detlev Kruger
Institute of Virology
Humboldt University
DDR-1040 Berlin
GDR
4. James van Etten
Dept. Plant Pathology
University of Nebraska
Lincoln, NE

Alternate:

Stanley Hattman
Dept. of Biology
University of Rochester
Rochester NY 14627

PLENARY SESSION II: DNA METHYLATION IN PLANTS
(SAT. EVE. 4/1/89; 8:00-10:15 P.M.)

1. (Chairperson)
Eric Selker
Institute of Molecular Biology
University of Oregon
Eugene, Oregon 97403
2. Hartmut Follman
Fachbereich Chemie der Universität
D-3550 Marburg
FRG
3. Drew Schwarz
Dept. of Biology
Indiana University
Bloomington IN 47405

Alternate:

N. Sternberg
Frederick Cancer Research Facility
Litton Bionetics Inc. Basic Research Program
NCI
Frederick, MD 21701

PLENARY SESSION III: STRUCTURE OF METHYLATED DNA AND CHROMATIN
(SUN. A.M. 4/2/89; 8:00-11:00 A.M.)

1. (Chairperson)
Alexander Rich
Dept. of Biology
MIT
Boston, MA 02139
(617)253-4715
2. Howard Cedar
Dept. of Molecular Biology
Hebrew University--Hadassah Medical School
Jerusalem, Israel 91010
3. Melanie Ehrlich
Dept. of Biochemistry
Tulane University Medical School
New Orleans LA 70112
(504)588-5291
4. Adrian Bird
MRC Mammalian Genome Unit
King's Bldgs. West Mains Road
Edinburgh, EH9 3JT, UK

Alternate:

Roger Adams
Dept. Biochemistry
University of Glasgow
Glasgow G12, UK

PLENARY SESSION IV: DNA METHYLATION IN DIFFERENTIATION AND TUMORIGENESIS
(SUN. EVE. 4/2/89; 8:00-10:15 P.M.)

1. Chairperson
Robin Holliday or Marilyn Monk
Genetics Division
National Institute of Medical Research
Mill Hill, London NW7 1AA, UK
2. Andrew Lassar
1124 Columbia Street
Hutchinson Cancer Center
Seattle WA 98104
3. Arthur Riggs (presently on sabbatical in Australia)
1500 E. Duarte Rd.
Beckman Research Institute City of Hope
Duarte CA 91010
(213)359-8111

Alternate:

Helen Blau
Dept. of Pharmacology
Stanford University School of Medicine
Stanford CA 94305
(415)497-6209

PLENARY SESSION V: DNA METHYLATION AND GENE EXPRESSION
(MON. A.M. 4/3/89; 8:00-11:00 A.M.)

1. Chairperson
Arthur Weissbach
Assoc. Director
Roche Institute of Molecular Biology
Nutley NJ 07110
(201)235-2317
2. Jean-Pierre Jost
Friedrich Miescher Institute
P.O. Box 2543
CH-4002 Basel
Switzerland
(061)37 66 88

3. Walter Doerfler
Institute fur Genetics
Weyerthal 121
University of Cologne
Cologne 41, FRG D 5000 (0221)470-2386

4. Dawn Willis
Dept. Virology/Molecular Biology
St. Jude Children's Research Hospital
332 N. Lauderdale
Memphis TN 38101
(901)522-0403

Alternates:

Anthony Furano
National Institutes of Health
Bethesda MD 20892

Barbara Migeon
CNSC 10-04
Jonhs Hopkins Hospital
Baltimore MD 21205

PLENARY SESSION VI: GENOMIC IMPRINTING
(MON. EVE. 4/3/89; 8:00-10:15 P.M.)

1. Chairperson

Philip Leder
Department of Genetics
Harvard Medical School/Howard Hughes Medical Inst.
Boston, MA 02115
(617)732-2091

OR:

Judith Swain
Dept. of Medicine
Duke University Medical Center
Box 3828
Durham, NC 27710
(919)684-5732

2. Peter A. Jones
University of Southern California Comprehensive Cancer Center
P.O. Box 33800
Los Angeles CA 90033-0800
(213)224-6503

3. Carmen Sapienza
Dept. of Biology
Centre Human Genetics
McGill University
1205 Ave. Docteur Penfield
Montreal, Quebec, Canada H3A1B1

Alternate:

M. Surani
Institute of Animal Physiology
Cambridge CB2 4AT, UK

Format for RNA Sessions

Day 1. Methylation of Messenger RNA

Morning. I. Structure, Genesis, and Function of mRNA Caps
Shatkin, Perry, Moss, Bannerjee

Evening. II. Relationship of Methylation of Appearance of
mRNA in the Cytoplasm.

Beemon, Rottman, Groner, Dane?

Day 2.

Morning. Ribosome Structure and rRNA Methylation
Maden, Noller, Planta, etc.

Evening. Role of Methylation in rRNA Maturation
Pogo, etc.

Day 3.

Morning. Functional Aspects of rRNA Methylation.
Cundliffe, Clawson, Van Knippenberg, etc.

Evening. Potential--Nucleic Acid Methylases
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